What is claimed is:

1. A method for annealing a copper layer, comprising:

forming the copper layer on a substrate by electroplating in an integrated processing system; and

treating the copper layer in a gas environment in a chamber of the integrated processing system.

2. The method of claim 1, wherein the gas environment comprises a gas selected from the group consisting of nitrogen, argon and helium.

3. The method of claim 2, wherein the gas environment further comprises a hydrogen-containing gas.

4. The method of claim 3, wherein the hydrogen-containing gas is hydrogen.

5. The method of claim 4, wherein the hydrogen is present at a concentration of less than about 5% in the gas environment.

6. The method of claim 5, wherein the copper layer is treated for a time duration less than about 5 minutes.

7. The method of claim 6, wherein the copper layer is treated at a temperature of between about 100 to about 500°C.

8. The method of claim 7, wherein the gas environment comprises less than about 100 parts per million of oxygen.

9. The method of claim 8, wherein the gas environment comprises a pressure of up to about 1000 torr.

10. A copper layer having a resistivity of less than about 1.8 μohm-cm formed by a method comprising:

forming an electroplated copper layer in an integrated processing system; and

treating the electroplated copper layer in a gas environment in a chamber of the integrated processing system.

11. A method of annealing a copper layer, comprising:

forming the copper layer on a substrate by electroplating in an integrated processing system;

treating the copper layer in a gas environment at a temperature of between about 100 to about 500°C for a time duration of less than about 5 minutes in a chamber of the integrated processing system; wherein the gas environment comprises a gas selected from the group consisting of nitrogen, argon, and helium.

12. The method of claim 11, wherein the gas environment further comprises hydrogen at a concentration of less than about 5%.

13. The method of claim 12, wherein the gas environment further comprises less than about 100 parts per million oxygen.

14. The method of claim 13, wherein the gas environment comprises a pressure of up to about 1000 torr.

15. A copper layer having a resistivity of less than about 1.8 μohm-cm formed by a method comprising:

treating the layer of copper in a gas environment comprising a gas selected from the group of nitrogen, argon and helium, for a time duration less than about 2 minutes at a temperature of at least about 150°C.

16. An integrated processing system for annealing copper, comprising:

an electroplating chamber for forming a copper layer on a substrate;

a cleaning station for cleaning the substrate;

an annealing chamber comprising an annealing gas source and a heated substrate support; and

a transfer mechanism for transporting the substrate within the integrated processing system.

17. The apparatus of claim 16, wherein the annealing gas source comprises a gas selected from the group of nitrogen argon and helium, and the heated substrate support is maintained at a temperature between about 100°C to about 500°C.

18. The apparatus of claim 16, wherein the annealing gas source comprises less than about 5% of hydrogen.

19. A computer storage medium containing a software routine that, when executed, causes a general purpose computer to control an integrated processing system using a method for annealing copper comprising:

forming a copper layer on a substrate by electroplating in an integrated processing system; and

treating the copper layer in a gas environment in a chamber of the integrated processing system.

20. The computer storage medium of claim 19, wherein the gas environment comprises a gas selected from the group of nitrogen, argon or helium.